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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/536,576	02/06/2006	Piotr Szwaykowski	TROLOGY 02.02	9931

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EXAMINER	
LEE, HWA S	

ART UNIT	PAPER NUMBER
2886	

NOTIFICATION DATE	DELIVERY MODE
01/14/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/536,576	SZWAYKOWSKI ET AL.	
	Examiner	Art Unit	
	Hwa S. Andrew Lee	2886	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 December 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-33 and 35-41* is/are pending in the application.

4a) Of the above claim(s) *36-39* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-33,35,40 and 41* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Remarks

The examiner would like to thank Mr. Norman Soloway for his time during several phone interviews. The supplemental amendment of 10/19/10 has been entered. The proposed amendment of 12/29/10 has not been entered.

It is with regret that the present claims do not appear to be in condition for allowance. The proposed amendment of December 29, 2010 would reintroduce matter which was rejected previously in the office action of July 22, 2010 for lacking written description and then deleted in the amendment of October 4, 2010. If entered, the same rejection for lacking written description would have been repeated. In addition, it is the examiner's opinion that Kuchel would meet the limitation of "the beams of light are in phase with one another" since the beams leaving the beamsplitting mirror would be in phase with one another as there is nothing that would shift the phase of one of the beams at the point where both beams emerge from the beamsplitting mirror. The emerging beams would also be spatially displaced since they are orthogonal.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 3-33, 35, 40 and 41 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The recitation of “as they are provided to” is not clear. The

recitation may be stating when something occurs i.e. the paths of the beams are displaced at the same time as they are provided to the test object and reference object. The recitation may be stating that the beams are spatially displaced at the location where the beams are incident on the test object and reference object. The recitation may be stating that the beam paths are spatially displaced along the whole path from the light source to the test object and reference object. The recitation may be stating that at the beam paths are spatially displaced at the time the beams are provided (i.e. the time the two beams are produced or as they are sent to the test and reference objects.). Furthermore, it is unclear how the beam paths can be spatially displaced yet "substantially follow a common pathway" or are overlapped. It is not clear if the entire lengths of the paths are spatially displaced or a portion is displaced. The recitation that the test beam and the reference beam are overlapped (e.g. claim 29) indicates that a portion of the beams is not spatially displaced while some other portions are displaced.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 3-11, 13, 14, 16-21, 26-33, 35, 40 and 41 are rejected under 35 U.S.C. 102(b) as being anticipated by Kuchel (US 4,872,755).

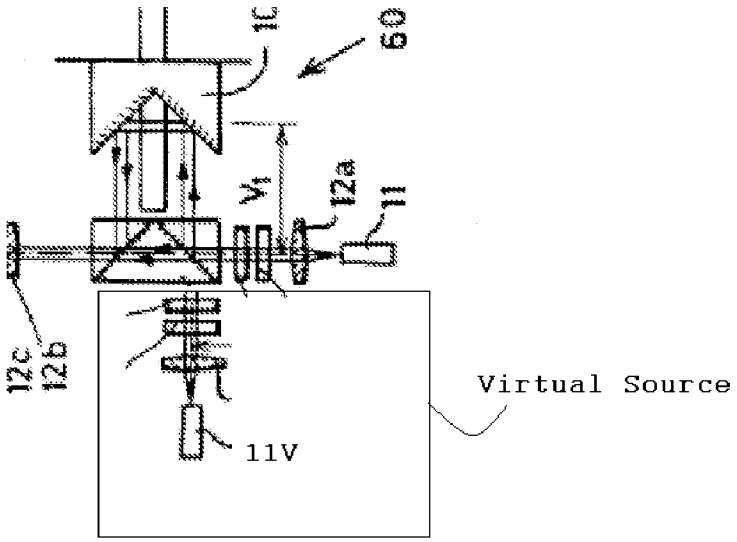
Kuchel show an interferometer for measuring optical phase differences (e.g. Figure 6) comprising:

a reference object (e.g. 14);

a test object (e.g. 16);

at least two spatially separated light sources (11, 11V, please see diagram below showing how there is a source (11) and a virtual source (11V) created by the beamsplitter. The source (11) and virtual source (11V) are spatially separated) that generate mutually orthogonally polarized beams of light, wherein the mutually orthogonally polarized beams of light are spatially displaced with respect to each other (as the beams exit the first polarizing beam splitting mirror, the beams are spatially separated as they are provided to the test and reference objects) as they are provided to at least the reference object and the test object for interaction with said beams; and

a simultaneous phase shifting module (68) receiving at least a portion of said beams after said beams have interacted with said reference object and said test object and generates at least two phase-shifted (67b) interferograms substantially simultaneously from said beams.



In addition, the functional recitations following "that generate…" and "that receives" do not serve to distinguish because they are narrative in form since sufficient structure is not recited to support the function. The recitations of "that generates" and "that receives" only recite the intended function and is not supported by sufficient structure to distinguish from the structure of the prior art. If the prior art shows the same claimed structure (e.g. "at least two spatially separated light source") the prior art would perform the function (e.g. "generate mutually orthogonally polarized beams of light"). For instance two spatially separate light source may recite sufficient structure to support a function of producing two spatially separate beams of light, but is not sufficient structure to produce mutually orthogonal polarizations. If these functions are critical, then the elements that perform the functions would be critical in a claim drawn to structure.

As such, Kuchel shows the same claimed structure of:

a reference object (14);

a test object (16) ;

a least two spatially separated light sources (11, 11V); and

a simultaneously phase shifting module (68).

In addition, M.P.E.P. 2114 [R-1] states:

2114 [R-1] Apparatus and Article Claims - Functional Language

APPARATUS CLAMS MUST BE STRUCTURALLY DISTINGUISHABLE FROM THE PRIOR ART

While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. In re Schreiber, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997) (The absence of a disclosure in a prior art reference relating to function did not defeat the Board's finding of anticipation of claimed apparatus because the limitations at issue were found to be inherent in the prior art reference); see also In re Swinehart, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971); In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). "[A]pparatus claims cover what a device is, not what a device does." Hewlett-Packard Co. v. Bausch & Lomb Inc., 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990) (emphasis in original).

With respect to claims 3 and 4, see polarizing beamsplitter (60a) that produces the orthogonal test and reference beams that are spatially separated.

With respect to claim 5, the reference and test beams received by said simultaneous phase shifting module substantially overlap each other.

With respect to claim 6, the laser (11) produces the mutually orthogonally polarized beams that are coherent.

With respect to claim 7, the beamsplitter (60a) splits the beam from laser (11) to produce two spatially separated sources.

With respect to claims 8 and 18, beamsplitter 12d is an alignment module positioned to intercept the beams between the interferometry module and the simultaneous phase-shifting module.

With respect to claim 9, 17b, 67a, and 18a-d are imaging modules.

With respect to claims 10, 20, and 21, the at least two spatially separated light sources are comprised of a linearly polarized light source (11) and a polarization beamsplitter (60a) configured to split linearly polarized light into said two mutually orthogonally polarized beams, wherein said polarization beamsplitter comprises a prism.

With respect to claim 11, the sources are virtual.

With respect to claims 13 and 14, the interferometric system further comprises a nonpolarizing beamsplitter (12d) wherein the nonpolarizing beamsplitter is positioned substantially between the light sources and the reference object (14).

With respect to claim 17, the interferometry system is of a Fizeau configuration.

With respect to claim 19, Kuchel shows an imaging module (17b, 67a) is positioned to intercept the beams between the test object and the simultaneous phase shifting module.

With respect to claim 26, polarization beamsplitter (6) comprises a beamsplitter (60a) which are made of two virtual cube beamsplitters and further comprises a mirror (10b).

With respect to claims 27 and 28, Kuchel shows an aperture filter (17a) to block said other portion of the beams from entering the simultaneous phase shifting module.

With respect to claim 29, Kuchel shows:

a source (11) of polarized light and a polarization beamsplitter (first polarizing beamsplitter of 60a) that generates mutually orthogonally polarized beams of light, which are spatially displaced with respect to each other as they are provided to at least to the reference object and the test object, wherein said beams follow a substantially common pathway;

means for overlapping (13) a test beam and a reference beam; and

a phase shifting module (68) for receiving at least a portion of said beams after said beams have interacted with the reference object and the test object to generate at least two phase-shifted (67b) interferograms substantially simultaneously from said test and reference beams.

With respect to claim 30, the polarized light from said source is linearly polarized.

With respect to claim 31, elements (18a-d) are means for viewing said test and reference beams.

With respect to claim 32, polarizing beamsplitter (68b or 68c) is a means for selecting said test and reference beams.

With respect to claim 33, Kuchel shows:

a reference object (14);

a test object (16);

a source (11) of linearly polarized light, and a polarization beamsplitter (first polarizing beamsplitter of 60a) that generates mutually orthogonally polarized wavefronts, which are spatially displaced with respect to each other as they are provided to said test object and said reference object wherein orthogonally polarized reference wavefront and orthogonally polarized test wavefront are reflected from said reference object and said test object, respectively;

a beam splitter (12d) and a collimator (13);

means for overlapping (17) one of said orthogonally polarized reference wavefront with one of said orthogonally polarized test wavefronts;

a simultaneous phase shifting module (68) that receives said overlapping one reference wavefront and said one test wavefront and generates at least two phase-shifted (67b) interferograms substantially simultaneously.

With respect to claim 35, delay (10b, 10m, 10r) is a variable phase retarder.

With respect to claim 40, the beams follow a substantially common path through the interferometric system.

With respect to claim 41, if it is intended that the paths the beam paths are spatially separated at the location of the reference object and test object, please see Figure 5 or 9, for example.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 12, 15, 16, and 22-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuchel as applied to their respective independent claim or as applied to claims 1 and 33 above.

With respect to claim 12, Kuchel does not show the sources being real; however it is well known in the art that there are several ways to make orthogonally polarized beams, including the use of two separate real sources. At the time of the invention, one of ordinary skill in the art would have used two real sources in order to produce beams of high intensity. By using two real sources, the beams have more intensity than the use of a single source where the beam is split in intensity to produce the two beams.

With respect to claims 15, 16, and 34, Kuchel shows the quarter wave plate located in the source, and not positioned between the source module and the reference object, however the relocation of a working part only requires routine skill in the art.

With respect to claims 22-25, Official Notice is taken that the different forms of polarizing beamsplitters are well known in the art and are functional equivalents. At the time of the invention, a skilled artisan would have used calcite for its quality optical properties, would have used a cube splitter for low cost, and would have used optical fibers for flexibility.

Response to Arguments

Applicant argues that Kuchel does not show "spatial displacement as they are provided to the reference object and the test object" In response, the examiner submits that the recitation is drawn to functional language and does not structurally distinguish from Kuchel. Kuchel shows the same claimed structure of two spatially separated light sources and therefor would also generate mutually orthogonally polarized beams of light that are spatially displaced with respect to each other as they are provided to at least the reference object and the test object. The recitation of "generate mutually orthogonally polarized beams of light, wherein the mutually orthogonally polarized beams of light are spatially displaced with respect to each other as they are provided to at least the reference object and the test object," is functional in that the recitation describes what the two light sources do.

Furthermore, lacking definiteness in either the claims or the specification, the recitation of "the beams are spatially separated as they are provided to the test and reference objects" can reasonably be interpreted to mean that the beams are separated at the time the beams are sent towards the test and reference objects. As such, Kuchel shows that the beams are created and separated at the time the beams are sent towards the test and reference objects.

Conclusion

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no, however, event will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hwa S. Lee (Andrew) whose telephone number is 571-272-2419. The examiner can normally be reached on Monday, Tuesday, Thursday, and Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tarifur R. Chowdhury can be reached on 571-272-2800. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Hwa S. Lee (Andrew)/
Primary Examiner, Art Unit 2886

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